



Integrating pests and pathogens into the climate change/food security debate

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Year: 2009
Journal: Journal of Experimental Botany. 60 (10): 2827-2838

Abstract:

While many studies have demonstrated the sensitivities of plants and of crop yield to a changing climate, a major challenge for the agricultural research community is to relate these findings to the broader societal concern with food security. This paper reviews the direct effects of climate on both crop growth and yield and on plant pests and pathogens and the interactions that may occur between crops, pests, and pathogens under changed climate. Finally, we consider the contribution that better understanding of the roles of pests and pathogens in crop production systems might make to enhanced food security. Evidence for the measured climate change on crops and their associated pests and pathogens is starting to be documented. Globally atmospheric [CO₂] has increased, and in northern latitudes mean temperature at many locations has increased by about 1.0-1.4 degrees C with accompanying changes in pest and pathogen incidence and to farming practices. Many pests and pathogens exhibit considerable capacity for generating, recombining, and selecting fit combinations of variants in key pathogenicity, fitness, and aggressiveness traits that there is little doubt that any new opportunities resulting from climate change will be exploited by them. However, the interactions between crops and pests and pathogens are complex and poorly understood in the context of climate change. More mechanistic inclusion of pests and pathogen effects in crop models would lead to more realistic predictions of crop production on a regional scale and thereby assist in the development of more robust regional food security policies.

Source: <http://dx.doi.org/10.1093/jxb/erp080>

Resource Description

Communication: ☒

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience: ☒

audience to whom the resource is directed

Policymaker

Exposure : ☒

weather or climate related pathway by which climate change affects health

Climate Change and Human Health Literature Portal

Ecosystem Changes, Extreme Weather Event, Food/Water Security, Temperature

Extreme Weather Event: Drought

Food/Water Security: Agricultural Productivity

Geographic Feature: 

resource focuses on specific type of geography

None or Unspecified

Geographic Location: 

resource focuses on specific location

Global or Unspecified

Health Impact: 

specification of health effect or disease related to climate change exposure

Malnutrition/Undernutrition

Mitigation/Adaptation: 

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern: 

populations at particular risk or vulnerability to climate change impacts

Low Socioeconomic Status

Resource Type: 

format or standard characteristic of resource

Review

Resilience: 

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

Timescale: 

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: 

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content

